

What is claimed is:

1. A method for simulating thermal flows for casting/molding processes, comprising:
 - (a) selecting simulation modules for incorporation in an overall simulation sequence, said modules including a Flow in Shot Sleeve Module, a Shrinkage Porosity Prediction Module, a Heat Transfer Fluid Line Module, and a Die Lubricant Cooling Module; discretizing flow domain into elements having nodes and fluxing surfaces, inputting initial parameter value and process conditions;
 - (b) incrementing the time by an incrementing time step;
 - (c) updating material balance;
 - (d) forming and solving momentum equations, and updating velocity and pressure fields;
 - (e) forming and solving energy equations, and updating temperature field;
 - (f) checking if parameters have converged, returning to step (d) if they have not;
 - (g) determining whether an end-simulation event has occurred, returning to step (c) if it has not; and
 - (h) deciding whether to execute post-processor simulation modules, said post-processor simulation modules including a Melt Line Prediction Module.

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